



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
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OFFICE OF
ENVIRONMENTAL
CLEANUP

MEMORANDUM

APR 13 2016

SUBJECT: Region 10 Response to NRRB Comments, Wyckoff Eagle Harbor

FROM: Sheryl Bilbrey, Director
Office of Environmental Cleanup

A handwritten signature in blue ink, appearing to read "Sheryl Bilbrey".

TO: Amy R. Legare, Chair
National Remedy Review Board

EPA Region 10 appreciated the opportunity to present our proposed cleanup plan for the Wyckoff/Eagle Harbor Superfund site to the National Remedy Review Board (NRRB). Region 10 has considered your input in development of its Proposed Plan. The Board's comments and responses are provided below.

Remedial Action Objectives/Preliminary Remediation Goals

The package presented to the Board includes a RAO for restoring the lower aquifer groundwater to beneficial use within a reasonable timeframe. During the presentation, the Region clarified that, as part of its proposed interim remedy, it intends to monitor and collect data to evaluate better how effective its preferred approach for cleaning up the contaminated soils in the upland area would be in protecting the lower aquifer. The Board notes that the Agency's long-standing policy has been that monitoring by itself is not a CERCLA remedial action. The Board recommends that the decision documents be clear that the interim remedy would not include a remedial action addressing restoration of the lower aquifer and that the RAOs be clarified accordingly.

R10 Response: The RAO for the lower aquifer has been revised to remove the language about restoring the lower aquifer to beneficial use. In the draft Proposed Plan, the Region has included language explaining that the current remedial decision is only for the upper aquifer and that no cleanup decision is being made for the lower aquifer at this time. The cleanup decision for the upper aquifer will be in an interim ROD amendment. A final cleanup decision for the soil and groundwater operable units will be made in a future CERCLA decision document, and a cleanup decision for the lower aquifer will be made at that time.

The package provided to the Board included several polycyclic aromatic hydrocarbon (PAH) preliminary remediation goals (PRGs) from the 2000 record of decision and Washington's Model Toxics Control Act (Method B for unrestricted use) for soil that are higher than the numbers provided in EPA's regional screening level table. The Board recommends that the Region review the PRGs and ensure that future decision documents reflect selection of protective cleanup levels.

R10 Response: The Region believes the MTCA numbers selected will be protective, and we note that the proposed future use of the site is a park where recreational, rather than residential, exposures are likely. The Method B numbers were selected by the Region for use as soil cleanup numbers in the 2000 ROD. We are not re-visiting that part of the decision, but we are updating the numbers to include revisions that the Washington Department of Ecology has issued between the 2000 ROD and now. Because all of the upland remedial alternatives considered include a final site cap and institutional controls, the remedial actions are not designed to achieve the soil PRGs throughout the soil column. The PRGs will also be used to determine the suitability of imported soils used to construct the final site cap.

Remedy Performance

The presentation to the Board provided two options, Alternatives 4 and 7, which appear to have the best opportunity to address a large quantity of NAPL mass. Addressing this mass has several opportunities to improve conditions at the site. While substantially contained, the NAPL mass has the potential to be a continuing source of PAHs to the sediments, surface water, and lower aquifer over the long term, and will require continuous O&M in its current state. The Board agrees that mass treatment/removal is valuable. The Board does not believe, however, that addressing NAPL mass provides a site-wide solution because it appears that containment of untreated residues will still be needed, whether Alternative 4 or 7 is implemented. When considering these two strategies, the Board recommends that the Region focus on implementing a source treatment/removal remedy that best supports what is ultimately a long-term containment strategy. The Board notes that an important priority of an amended remedy would be to undertake further response actions that improve the long-term effectiveness of containment and lower long-term O&M costs for the upland remedy.

R10 Response: The Region agrees that ensuring long-term effectiveness is a critical priority for this remedy. We also agree that long-term containment of the residual waste is necessary and thus the remedy must result in O&M requirements that are financially and practicably sustainable over a very long time frame. The Region continues to believe that Alternative 7 is the most cost effective approach that will achieve these goals.

With respect to how these alternatives' technical merits compare, it is unclear to the Board that treating more mass up front through Alternative 4 clearly provides a more cost-effective approach to achieving RAOs. Further, it is not clear to the Board that treating "all the mass," or even "95 percent of the mass," as anticipated by Alternative 4, is possible, given the nature and extent of the NAPL. For example, Alternative 4, as presented in the Board's package, relies on jet grouting of deep NAPL areas. It is unclear to the Board whether jet grouting used in this fashion will actually be effective in solidifying this deep NAPL. The Board notes that, based on Board member experience, it may be more difficult than anticipated to deliver and sufficiently blend amendments into the subsurface to solidify this material.

R10 Response: The Region agrees with the Board that augers, by turning over and blending the soil, ensure sufficient mixing to solidify NAPL even when the contamination occurs in discrete layers. Jet grouting does not physically mix the soil, so ensuring sufficient contact with the reagent is more difficult. However, the Region believes that jet grouting can be effective in solidifying soils contaminated with NAPL. Jet grouting can deliver reagent at a high enough pressure (more than 5,000 psi) to fluidize the soil and allow for sufficient reagent delivery. The radius that can be treated is much smaller than can be achieved with augers and the reagent delivery rate needs to be higher.

These requirements make jet grout grouting more expensive than auger mixing. Jet grouting is not included in Phase 1 of Alternative 7. The Region is optimistic that jet grouting will not be needed as part of Phase 2 actions, but we want to have the tool available as a possible option in case RAOs cannot be achieved with the NAPL recovery technology proposed by the Region to remove DNAPL deep in the northern portion of the site.

For Alternative 7, the Board notes that there are several areas of uncertainty with some Phase 2 components, which makes their effectiveness uncertain. It is also not clear to the Board how the Region will decide to move ahead with the various Phase 2 components of Alternative 7. The Region indicated that further work in the focused feasibility study is needed to develop more fully this alternative, including the costs, action triggers, performance metrics and time frames. The Board encourages the Region to perform this additional work so that it can better explain how Alternative 7 will achieve RAOs as well as explain how it compares to Alternative 4 in doing so.

R10 Response: At the time of the Board meeting, Alternative 7 had not been developed to the same level of detail as the other alternatives. Considerable work has been done over the last year to refine both the design and the cost estimate for Alternative 7. The Region also developed more specific performance measures and a clear list of conditions that would trigger further cleanup actions in Phase 2, if needed. Briefly, the Region is proposing Alternative 7, modified with an outside alignment for the new perimeter barrier wall. The alternative now includes a sufficient level of detail to support a cost estimate in the -30 percent to +50 percent cost range. The cost for Phase 1 only, using a 7% discount rate, is approximately \$71 million. If Phase 2 actions are needed, the overall cost would increase to \$83 million. Two conditions would trigger Phase 2 actions: (1) The continued presence of recoverable NAPL in or near the passive drain collection system; or (2) dissolved concentrations in the passive drain system that are too high to treat cost effect-effectively with passive filters.

The Region has presented a phased approach as part of Alternative 7. From the information presented to the Board, it appears that the most cost-effective approach would be to concentrate Phase 1 efforts on the expanded core area, which should address the majority of the identified principal threat waste using ISS. The Board recommends that Phase 1 be followed by a second phase that may use other types of response actions as part of the phased approach, as appropriate, in light of further monitoring. The Region also has acknowledged that it is considering different remedial options for Phase 2 that were not presented to the Board (e.g., thermal technologies, additional ISS, ISCO, etc.). The Board encourages the Region to continue evaluating potential remedial options for Phase 2 in the event Phase 1 remedial activities do not reduce contaminant mass sufficiently.

R10 Response: The Region concurs that a phased approach to addressing the NAPL mass in the upper aquifer is the most prudent approach. Phase 1 of Alternative 7 focuses on the “expanded core area” and uses other technologies to collect mobile LNAPL and DNAPL from less contaminated areas of the site. It is difficult to predict how solidification of soil in the “expanded core area” will impact the site’s water balance or contaminant concentrations outside the solidification area. New wells installed outside the solidification area during Phase 1 will be used to generate the data needed for this evaluation. The preferred alternative clearly articulates that the need for Phase 2 will be determined based on the results of Phase 1. It also clearly states that the need for any additional remedial technologies in Phase 2, other than thermal enhanced NAPL recovery, will be documented in a future CERCLA decision document.

The Board supports the development and use of innovative technologies for the treatment of contaminants, including EAB of dissolved-phase PAHs as is contemplated for the uplands in Alternative 7. Conceptually, the Board also believes that biodegradation could be applied to dredged sediments prior to placement on-site. It is likely that the contaminant concentration of the consolidated material from the shoreline sediment removal will not be at a "product" concentration and may be amenable to biodegradation. Therefore, the sediment may not require treatment by solidification. In addition, the Board believes that it may be possible to further enhance the biodegradation in groundwater (e.g., areas that do not contain product), with the use of additional materials (e.g., nutrients) beyond the use of oxygen. Potentially the EAB could reduce pump and treatment costs as a finishing step within select areas. The Board recommends that the Region consider and further evaluate the cost-effectiveness and applicability of biodegradation technologies in the overall remediation.

R10 Response: The Region agrees that nutrients may enhance the effectiveness of EAB in groundwater, and will explore this issue during remedial design. The Region appreciates the Board's suggestion to use biodegradation to treat the sediment removed from the intertidal beaches. Several factors suggest that biodegradation could be difficult to implement at this site. First, there may not be sufficient room to spread and work the sediments to facilitate biodegradation, which the Region assumes would require more area than stabilization (which could be done on a temporary pad). Second, odors may be a problem for nearby residents. Third, there may not be enough time in the schedule to allow for biodegradation – this depends on when sediment excavation occurs in the overall construction sequence. However, the sediment to be excavated is not uniformly contaminated and it may be possible to segregate the sediment, allowing a portion of it to be treated with biodegradation on site. The Region will evaluate the practicality of biodegradation during the pre-design phase, as part of planned waste characterization testing.

The Board notes that there is some uncertainty about the passive groundwater treatment's effectiveness if the attendant treatment system receives both low-level dissolved-phase constituents and NAPL. Alternatives 4 and 7 both currently include passive groundwater treatment as part of a long-term strategy for post-active remediation of upper aquifer groundwater contamination. If the passive system receives NAPL as a regular component of influent, the passive treatment components would need to be much more robust than are currently anticipated in the package presented to the Board. The Board recommends that the Region further develop and evaluate this remedial component prior to issuing a proposed plan and selecting a final remedy for the site.

R10 Response: The Board's concern is understandable – given the current high concentrations of dissolved contamination in the site's groundwater and the continued presence of NAPL. However, the Region believes that with significant source strength reduction in Phase 1 and some period of active pump and treat, it will be possible to eventually shift to passive treatment of groundwater. Several factors support this conclusion. First, the volume of water that will need to be treated will significantly less than the volume currently treated and discharged from the onsite treatment plant. The final site cap will be sloped to enhance runoff and will include drain pipes to collect surface water, significantly reducing infiltration of rain water into the contaminated soil below the cap. Second, groundwater data not available at the time of the Board meeting shows that contaminant concentrations in the top layer of upper aquifer groundwater (from the soil surface down to about 5 feet below the water table) are about 5 times lower than in deeper groundwater. Collecting water from this upper, cleaner layer for discharge will reduce the amount of treatment that will be required.

Third, groundwater EAB treatment will be focused in and around the passive drain collection system, which will further reduce residual groundwater contamination and lower the amount of treatment needed in the passive drain system. Finally, Alternative 7 now includes up to five years of active pump and treat operations following Phase 1. All these measures will work in concert to lower contaminant concentrations in the upper aquifer and allow for the efficient and effective use of a passive drain collection system.

It is difficult to predict with any degree of accuracy how soil solidification in Phase 1 will impact the site's water balance and contaminant concentrations outside the ISS footprint. Because of this uncertainty, the passive drain system will not be designed until after Phase 1 construction is complete. Armed with post Phase 1 data, the Region will be able to design the drainage system appropriately and simplify future O&M requirements as much as possible. The groundwater treatment plant will not be decommissioned until (1) passive treatment can meet discharge standards, and (2) passive treatment costs less than continued operation and maintenance of the groundwater treatment plant.

Applicable or Relevant and Appropriate Requirements

The applicable or relevant and appropriate requirements (ARARs) table provided by the Region did not include specific statutory and regulatory citations. The Board recommends that the decision documents include ARARs tables with specific citations as shown in Office of Solid Waste and Emergency Response (OSWER) Directive No. 9234.1-01, August 1988, CERCLA Compliance with Other Laws Manual, Part 1.

R10 Response: For the sake of brevity, the Region included a summary version of the ARAR tables in the Board's information package. The Region developed a more complete ARAR table for use in the Proposed Plan; a copy is enclosed with this letter. More detailed tables that include the specific statutory and regulatory citations are included in the upland and offshore FFS documents. The final versions of these tables will be included in the ROD amendment.

Monitored Natural Attenuation

The Region is considering monitored natural attenuation (MNA) as a potential alternative in a future remedial action to treat low-level contaminants remaining in the lower aquifer following source-area and dissolved-phase treatment in the upper aquifer. The Board recommends that future decision documents provide supporting evidence for MNA consistent with OSWER Directive No. 9200.4-17P, April 1999, Use of Monitored Natural Attenuation at Superfund, RCRA Corrective Action, and Underground Storage Tank Sites. Evidence should include site-specific information on contaminant biodegradability, anticipated contaminant flux from source areas, and geochemical or biological data supporting MNA of contaminants. Additionally, the Board recommends that during source area remediation, the monitoring network be evaluated to make sure monitoring locations are sufficient to assess MNA performance.

R10 Response: Because not all of the data needed to support an MNA determination is available, the Region is not proposing a remedy for the lower aquifer at this time. Conditions in the lower aquifer will be monitored during and after remedial construction in the upper aquifer, and the QAPP for lower aquifer sampling will be amended, consistent with the referenced guidance for the use of MNA, to ensure sufficient information is available to support a future remedial decision.

Costs

In the package presented to the Board, the O&M costs for Alternative 4 were \$5.5 million and for Alternative 7, \$29.8 million. However, during meeting discussions, the Region indicated that both alternatives' O&M costs needed further refinement. The Board recommends that in the decision documents, the Region include O&M costs for both alternatives that are based on accurate O&M estimates, as discussed in OSWER Directive No. 9200.1-37FS, May 2001, Operation and Maintenance in the Superfund Program.

R10 Response: The cost estimates for all the alternatives have been updated and the costs segregated into capital, O&M and periodic costs, consistent with the guidance cited by the Board.

The package provided by the Region included net present value (NPV) calculated at 1.9 percent and 7 percent. The Board recommends that NPV be calculated using 7 percent per OSWER Directive No. 9355.0-75, July 2000, A Guide to Developing and Documenting Cost Estimates During the Feasibility Study. However, both calculated values may be presented in decision documents along with an explanation for using 1.9 percent.

R10 Response: The cost estimates for all the alternatives have been updated using a discount rate of 7 percent, consistent with the cited guidance. The Proposed Plan also presents non-discounted costs and costs calculated using a discount rate of 1.4 percent, to illustrate for the reader how the discount rate impacts overall project costs. The Region notes that because this project will be funded with annual Congressional appropriations, the non-discounted costs may provide the most realistic estimates.

Effectiveness

Based on the information provided to the Board, both Alternatives 4 and 7 would involve use of ISS in achieving a protective remedy, but Alternative 4 would cost more than Alternative 7 Phase 1 in large part due to the greater amount of waste material to be treated with ISS. Both alternatives would meet RAOs. At the Board meeting, the Department of Ecology presented several arguments supporting Alternative 4 because it addresses a larger volume of source material with ISS thus potentially reducing the duration of remedy implementation and lowering uncertainty related to post-treatment groundwater quality and O&M. In contrast, Alternative 7's multi-phased approach would only be less expensive if some or all of the potential "Phase 2" actions are not needed. The Board notes that the NCP includes a provision (40 CFR 300.415(f)) addressing state enhancement of remedial actions in certain circumstances. The Board recommends that the Region explore whether there might be opportunities for State enhancement of the remedial action as a way to address the State's potential concerns regarding the timeframe to complete the cleanup and the O&M's long-term cost.

R10 Response: The Region is pleased to report that the State withdrew its objection to Alternative 7 shortly after the Board meeting. Regional staff members have continued to work closely with the State to refine Alternative 7, as described above. Although State enhancement is no longer needed to bridge the gap between Alternatives 4 and 7, this provision may provide a constructive path to resolve other requests that arise during the public review process.

The Board notes that all caps require monitoring in order to determine if rehabilitation might be needed to control contaminant flux into the water column. The Board recommends that until the Region completes its cap design, it should refrain from postulating how many caps may need to be replaced in a specified timeframe. The Board further notes that it is likely the caps can be designed to prevent any significant contaminant flux for over 50 years.

R10 Response: The Region agrees that the intertidal caps can be designed to minimize the need for replacement. Laboratory studies using NAPL from the site and beach sediment collected from the site will inform the final design of the amended layer. It is the Region's hope that no replacement events are needed. However, the Region believes it is important for the public and the State to understand that some level of maintenance may be required. The sediment cap replacement assumptions have been revised in the FFS for OU-1 to assume a smaller area and fewer replacement events – only one in the North Shoal, and two in the East Beach over a 100 year time span. The revised O&M costs are presented in the OU1 FFS and the Proposed Plan.

Conclusion

We commend the Region's collaborative efforts in working with the Board and stakeholder groups at this site. We request that a draft response to these recommendations be included with the draft proposed plan when it is forwarded to the Office of Superfund Remediation and Technology Innovation's Site Assessment and Remedy Decisions (SARD) branch for review. The SARD branch will work with both your staff and the Board to resolve any remaining issues prior to your release of the record of decision. This memo will be posted on the Board's website (<http://www.epa.gov/superfund/programs/nrrb>) within 30 calendar days of my signature. Once your response is final and made part of the site's administrative record your response will also be posted on the Board's website.

Thank you for your support and the support of your managers and staff in preparing for this review. Please call me at (703) 347-0124 should you have any questions.